March 1990

Data Highlights No. 9

Fields of study of women in higher education

Following *Data Highlights No. 8*, which focused on the enrolment of girls in third-level education, it is of interest to analyse the major fields of study of women in third-level education. Before doing so, however, two prefatory remarks are necessary. First, if women were equal to men, one could expect roughly equal numbers of female and male students distributed in a similar manner between the different fields of study. Secondly, if all fields of study can enrich the individual and society in a broad sense, some are valued more highly than others by society (i.e. those for which it is willing to provide jobs and prestige). This issue of *Data Highlights*, therefore, attempts to provide some data taken from a study prepared by the United Nations Educational, Scientific and Cultural Organization (UNESCO)[1] to illustrate these points in an indicative way. In view of the objective of this issue of *Data Highlights*, which is to identify and illustrate certain problems, even if the data are incomplete[2] and a field of study in one country does not correspond rigorously with one carrying the same label in another country, the patterns still appear valid and consistent, at this level of generality, with the observations made in previous issues of *Data Highlights*. In fact, in view of the importance of the implications of such data for both the advancement of women and national development, national authorities should give greater attention to improving the quality of such data.

In its study, UNESCO regrouped the 20 fields of study in higher education defined by the International Standard Classification of Education into two broad categories, i.e. arts: education (teacher training etc.) and social sciences; and sciences: natural sciences (engineering, computer science etc.), medical sciences and agriculture.

These distinctions correspond, to a certain extent, to the *traditional* roles of men and women: education and social sciences correspond to women's roles of understanding and caring, and are therefore labelled care-oriented fields; while the others, particularly natural sciences and agriculture, correspond more to men's role of changing the world and are therefore labelled action-oriented fields. Perhaps medical sciences incorporate both roles and thus form an intermediate category.

It is of interest, therefore, to examine the extent to which present-day youth are reproducing the traditional gender roles. This important topic will also be covered in *Data Highlights No. 10*. The present issue focuses on women's choices of field of study, while issue *No. 10* will compare these choices to those of men. The data presented are generally for 1982 and therefore the totals are slightly lower than those in *Data Highlights No. 8*, which presented more recent data.

Prepared by the Division for the Advancement of Women, Centre for Social Development and Humanitarian Affairs, United Nations Office at Vienna, with funds made available from a grant by the Government of Japan.

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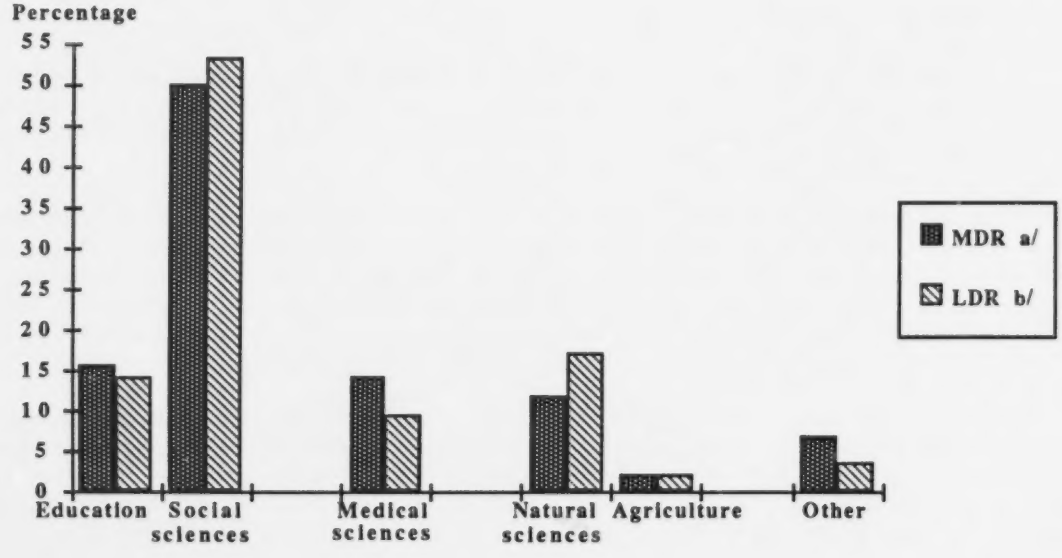
Table 1. Distribution of women by field of study in more developed regions and less developed regions, 1982 (Percentage)

		More developed regions		Less developed regions	
Care-oriented fields	(Education	16)		14)	
	(Social sciences	50)	66	53)	67
	Medical sciences	14		10	
Action-oriented fields	(Natural sciences	12)		17)	
	(Agriculture	2)	14	2)	19
	Others	7		4	

Source: Based on United Nations Educational, Scientific and Cultural Organization, *Female Participation in Higher Education: Enrolment Trends, 1975-1982*, Current surveys and research in statistics (Paris, 1985) (CSR-E-50).

Note: Numbers have been rounded.

Figure I. Distribution of women by field of study in more developed regions and less developed regions



Source: See table 1.

a/ More developed regions.

b/ Less developed regions.

The striking features of table 1 and figure I are the similarity between the distribution in the more developed regions and the less developed regions and the distribution according to traditional roles: two thirds of the female students are in care-oriented fields. Since natural sciences and agriculture account for less than one fifth of the female students, the question arises as to what the potential impact of female graduates will be on the development of their countries

over the next decades; for example, in industrialization, rural development or environmental issues. In view of the similarity of distribution between the more developed regions and the less developed regions, the process of development in itself does not appear to be sufficient to correct the distribution. A planned and systematic effort to correct the imbalance of the existing distribution should, therefore, be directed both at girls already in primary school and at their teachers and parents.

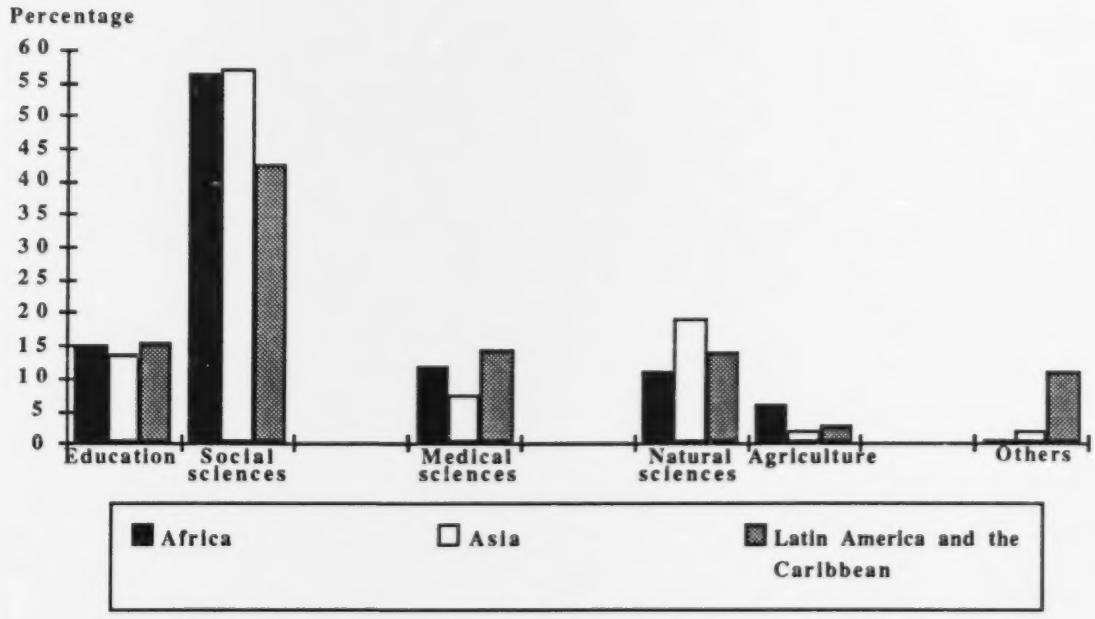
Are there differences between the developing regions?

Table 2. Distribution of women by field of study and region, 1982 (Percentage)

		Africa		Asia		Latin America	
Care-oriented fields	(Education	15)		14)		16)	
	(Social sciences	56)	71	57)	71	43)	59
	Medical sciences	12		8		14	
Action-oriented fields	(Natural sciences	11)		19)		14)	
	(Agriculture	6)	17	2)	21	3)	17
	Others	0		2		11	

Source: See table 1.

Figure II. Distribution of women by field of study in selected regions, 1982



Source: See table 2.

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As shown in table 2 and figure II, the regional breakdown of the fields of study for Africa and Asia shows great similarity for the care-oriented fields (around 70 per cent of the total of the female students). However, there appear to be slight differences in the sciences: Asian women appear to dominate in the natural sciences (21 per cent) compared with women from other regions; while Latin American women more frequently choose to study medical sciences and African women, agriculture.

Are there adequate numbers of female students to make an impact on their status and on development?

After noting the similarity in the patterns of choice, the number of students in each field can be related to the size of the population to give an idea of the size of the population among which the students would be working to promote the status of women and to advance national development. This can be done by estimating roughly the rate of students in each field per 100,000 inhabitants, which is an indicator of their case-load, and therefore different from that in *Data Highlights No. 8*, where an indication was given of the opportunities for girls to study by presenting the adjusted gross enrolment ratios that related them to their peer age groups.

The question that needs to be raised is, if the rates are of the magnitude given in table 3 and figure III below, what are the possible implications for development and the status of women?

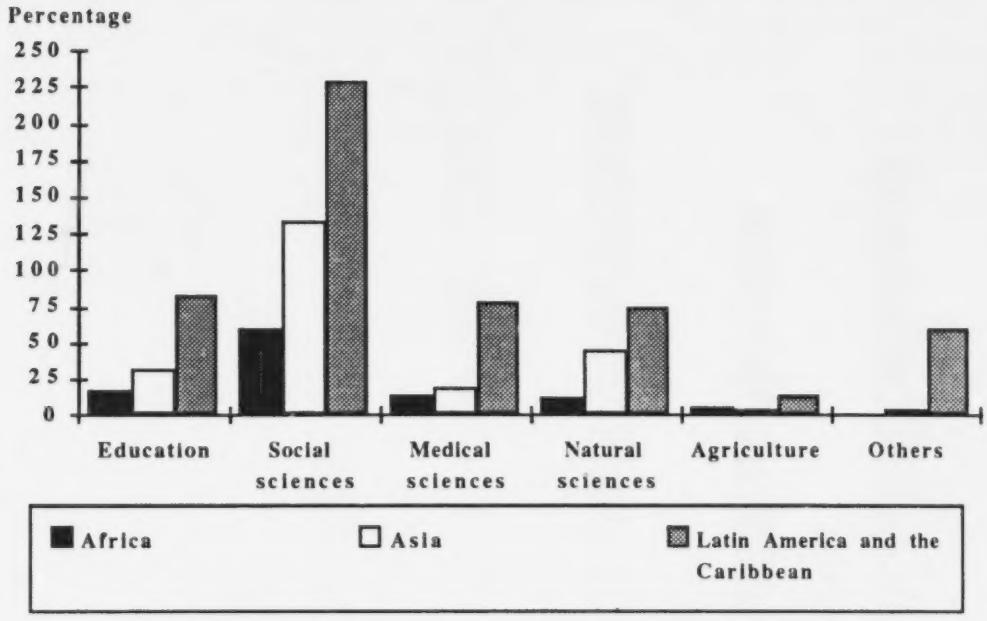
Some might consider that the figures given are deceptive since they imply that only the 1982 group of students will be working among the entire population, whereas students have been trained before that generation and many more will be trained after them. While this argument is true for the more developed regions, the reverse could be true for the less developed regions since the number of female students in third-level education has been very small in the past.

Table 3. Rate of female students per 100,000 inhabitants according to different fields of study

	Africa	Asia	Latin America and the Caribbean
Education	16	32	83
Social sciences	60	133	228
Medical sciences	13	18	77
Natural sciences	12	44	74
Agriculture	6	4	14
Others	-	3	60

Source: See table 1.

Figure III. Rate of female students per 100,000 inhabitants according to different fields of study



Source: See table 3.

As in *Data Highlights No. 8*, the progress made in Latin America is apparent. What is more important, however, is the contrast between the low rate of women studying agriculture and the fact that in Africa, for example, the population is still rural and most of the food is produced by women. The difference between the rates for women in developing regions and those for their sisters in developed countries is still important, as illustrated in table 4 and figure IV below, which show the number of times the figure is higher for developed regions; for example, the figure of 16 means that the number of women studying education is 16 times higher in more developed regions than it is in Africa.

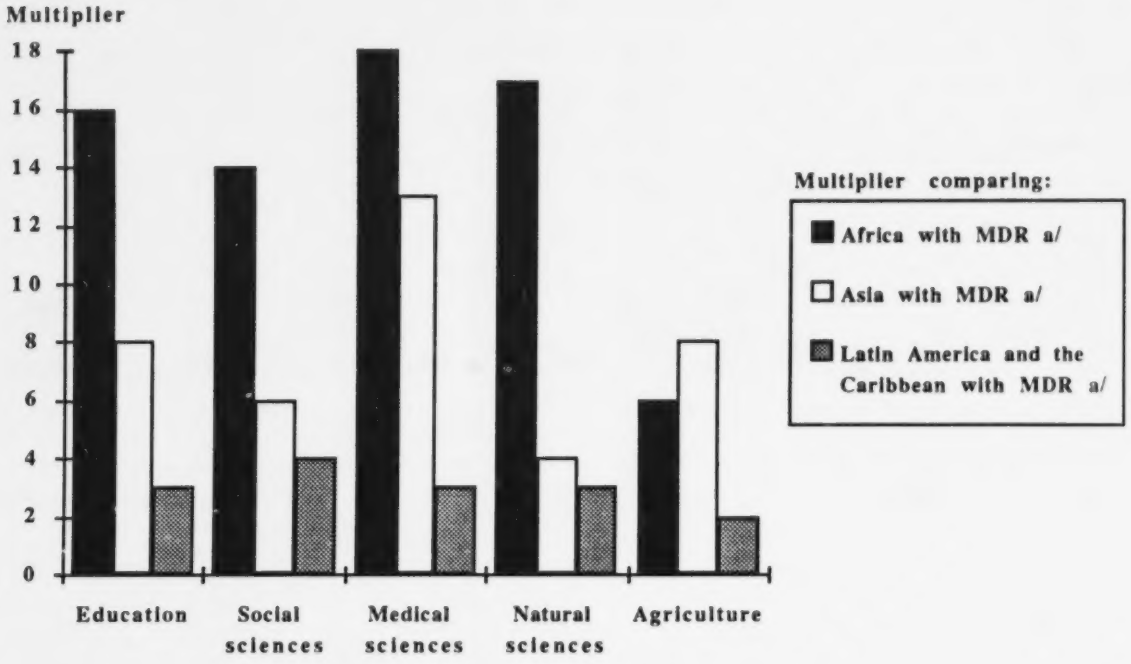
Table 4. Comparison between more developed regions and less developed regions of the number of female students per 100,000 inhabitants in different fields of study (Multiplier) a/

	Africa compared with more developed regions	Asia compared with more developed regions	Latin America and the Caribbean compared with more developed regions
Education	16	8	3
Social sciences	14	6	4
Medical sciences	18	13	3
Natural sciences	17	4	3
Agriculture	6	8	2

Source: See table 1.

a/ The multiplier is obtained by dividing the number of female students, in a field of study, per 100,000 inhabitants in more developed regions by the number per 100,000 inhabitants in less developed regions.

Figure IV. Comparison between more developed regions and less developed regions of the numbers of female students per 100,000 inhabitants in a field of study



Source: See table 4.
a/ More developed regions.

Could the gap between the developing and developed countries be closed rapidly?

In most developed countries, even with high rates of female student enrolment over several decades (i.e. with the expected cumulative or possibly compounding effect), problems still remain in the area of equality between the sexes. The gap between the more developed regions and the less developed regions provides an idea of the magnitude of the investment in human resources that would be necessary to close the gap. Although third-level education is not the only way to resolve the issue of advancement of women, it is also an important factor. The question is whether there are short cuts that could provide not short-term victories, but sustainable advancement.[3]

Notes

nited Nations Educational, Scientific and Cultural Organization, *Female Participation in Higher Education: lment Trends, 1975-1982*, Current surveys and research in statistics (Paris, 1985) (CSR-E-50).

2 The data have been taken from *Female Participation in Higher Education...*, tables A.1.2, A.1.6, A.3.2, A.3.4, A.5.2 and A.5.4. A few of the largest countries were not covered by the data; for example, Brazil, China, the United States of America and the Union of Soviet Socialist Republics.

3 Statement by the Division for the Advancement of Women, United Nations Office at Vienna, at the WHO Consultation with International Women's Non-governmental Organizations, Geneva, 21-22 December 1989, p. 3.

April 1990

Data Highlights No. 10

Comparison between the enrolment of women and that of men in different fields of study

Data Highlights No. 9 highlighted some facts on women's choice of fields of study at the third level of education that have implications for development.

In the present issue, which ends the series of *Data Highlights* on education (*Nos. 6-10*),[1] emphasis is placed on comparing male and female students in their selection of fields of study.[2] The rough distinction made in *Data Highlights No. 9* between care-oriented fields of study and action-oriented ones is used to show whether younger generations of women are choosing a *traditional* role for their contribution to society or a more modern one. The coverage of countries is the same as in *Data Highlights No. 9*. The gender ratio in each field is presented in order to highlight the impact of the numbers of men and women in each field of study and an attempt is made to show the combined effect of the numbers and the distribution.

Are men and women similar in their choice of fields of study?

The data in table 1 show the percentage of students who have reached the third level of education and who have therefore survived the discrimination or selection processes undergone since those students started school. Introducing change, therefore, requires modifications at all stages in a student's school career. While a comparison of the choices made by or for male and female students does not imply a value judgement on the part of the Division for the Advancement of Women, it can be assumed that, for the present, it does imply a societal judgement.

Table 1. Distribution of male and female students by field of study in more developed regions and less developed regions, 1982 (Percentage)

		More developed regions		Africa		Asia		Latin America and the Caribbean	
		Male	Female	Male	Female	Male	Female	Male	Female
Care-oriented fields	(Education	5	16	10	15	6	14	8	16
	(Social (sciences	40	50	52	56	56	57	36	43
	Medical sciences	9	14	9	12	4	8	10	14
Action-oriented fields	(Natural (sciences	36	12	20	11	30	19	38	14
	(Agriculture	4	2	7	6	3	2	6	3
	Others	6	6	1	0	1	2	3	11

Source: Based on United Nations Educational, Scientific and Cultural Organization, *Female Participation in Higher Education: Enrolment Trends, 1975-1982*, Current surveys and research in statistics (Paris, 1985) (CSR-E-50).

Note: Numbers have been rounded.

Prepared by the Division for the Advancement of Women, Centre for Social Development and Humanitarian Affairs, United Nations Office at Vienna with funds made available from a grant by the Government of Japan.

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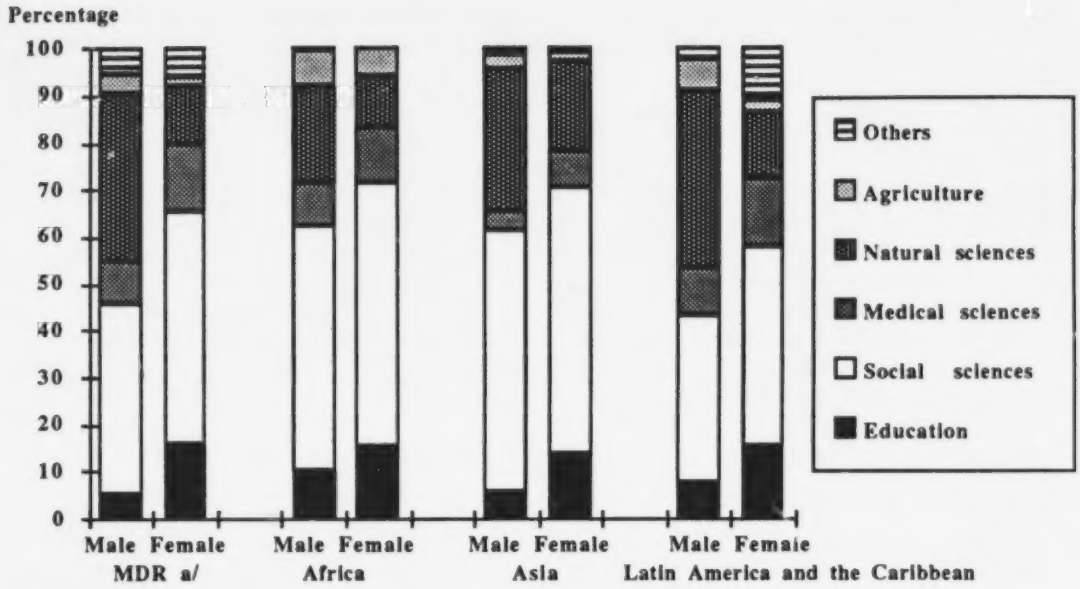
Figure I. Distribution of male and female students by field of study (Percentage)



Source: See table 1.

a/ More developed regions.

Table 1 and figure I clearly show the preference of women for the fields of teaching, social sciences and medical sciences when these preferences are compared with those of men. Such preferences do not necessarily mean that women dominate these fields numerically: this depends also on the enrolment ratios which, as seen in *Data Highlights No. 8*, are usually much lower for women. Table 1 also shows the considerable dominance of men in the fields of natural sciences (for whom they are from two to three times as frequent a choice) and agriculture. Except for Africa, where a ratio of only 1 man in 5 selects natural sciences as a field of study, the ratio in other developing regions is roughly 1 in 3, with nearly 4 in 10 men in Latin America selecting natural sciences. In contrast, between 1 in 7-9 women choose natural sciences, with the exception of Asia, where the ratio is 1 in 5. Agriculture is not a popular choice for either men or women, which is serious in view of the importance in developing regions of issues related to rural development and food, particularly in Africa and Asia.

Some questions can be raised. Are such differences in distribution desirable from the perspective of the status of women? If not, what could be done to change the distribution, in particular, by the female teachers and social scientists? Should special scholarships be introduced for women to study science or incentives given to parents to encourage their daughters to study agriculture? Are there countries in which certain fields of study *de jure* or *de facto* are not open to women students or for which there would be no possibility of employment even if women pursued such studies? One factor of concern is that the data provided are for 1982 and therefore cover the present generation of young adults: there seems to be a considerable difficulty in modifying the selection process, which may restrict the future advancement of women for a number of years.

In which fields do women students dominate numerically?

Table 2 shows the percentage of women in each field of study and is therefore independent of the distribution for each sex, but dependent on the enrolment rates by sex for each field. This means that even in an area of study preferred by women, they can still find themselves in a minority if their enrolment rates in third-level education are much lower than those of men.

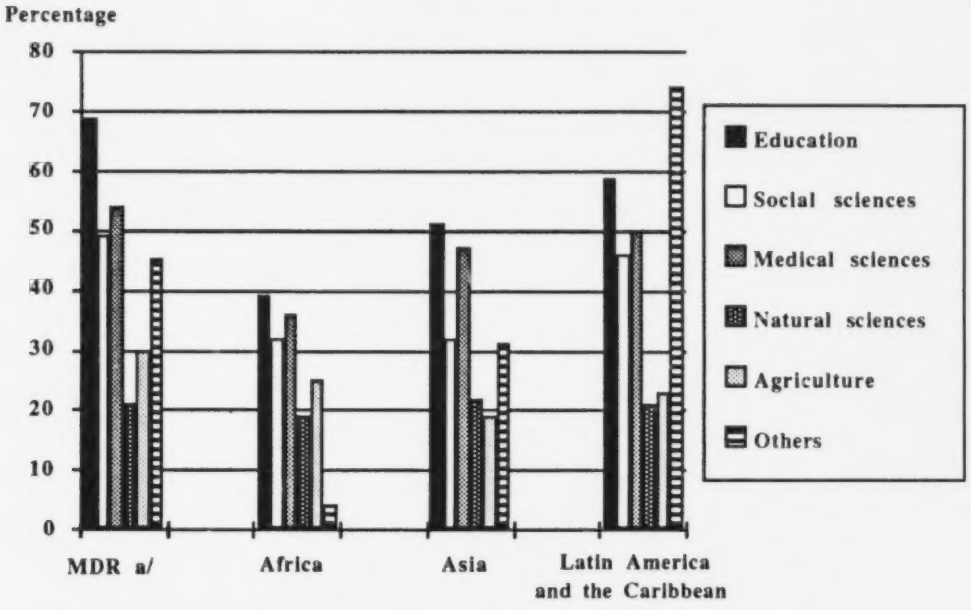
Table 2. Percentage of women in each field of study in more developed regions and less developed regions, 1982

		More developed regions	Africa	Asia	Latin America and the Caribbean
Care-oriented fields	(Education	69	39	51	59
	(Social (sciences	49	32	32	46
	Medical sciences	54	36	47	50
Action-oriented fields	(Natural (sciences	21	19	22	21
	(Agriculture	30	25	19	23
	Others	45	4	31	74

Source: See table 1.

Note: Numbers have been rounded.

Figure II. Percentage of women in each field of study



Source: See table 2.

a/ More developed regions.

Table 2 and figure II also show that, except for Africa (and to some extent Asia), parity has been achieved or is close to being achieved in the fields of education, social sciences and medicine. What will be the impact of the present parity in the future implementation of the acquired skills? For example, will the women social scientists be able, through their study of societies, to influence policies in favour of women? Of course, other factors intervene, such as the funding of research, but the influence of women social scientists should be monitored and women should be encouraged to

organize themselves and to articulate issues for the advancement of women. Another issue that will emerge or is emerging in relation to these ratios of students is that of fairness between the sexes in career patterns and decision-making. A word of caution is also necessary, however; in certain cases, an over-feminization can result in a field being equated with low prestige and becoming a ghetto. This could already be the case in certain countries as far as the field of education is concerned.

If women are to catch up in the field of natural sciences, considerable efforts will be required over a long period of time not only because it is difficult in most cases to select natural sciences at the third level if this field was not already selected at the secondary level, but also because of the high proportion of men in natural sciences. However, considering the data for agriculture in tables 1 and 2, and given that this field is not popular with men or women, a shift in women's preferences towards agriculture could have a rapid and dramatic impact in developing countries. This issue should perhaps be considered by policy makers, particularly in Africa and Asia: not only could women have an impact in helping to increase food production, but also the introduction of modernization could be expected to take into account the needs of rural women and their status.

Can the world be changed through the advancement of women?

In table 3 and figure III, the combined effects of the enrolment ratios and distribution are illustrated. This means, for example, that out of 100 students of both sexes in the more developed regions, only one woman is studying agriculture; the corresponding number for Africa is two and for Asia and Latin America, one. Such figures should be compared with national priorities and estimated needs: conclusions can then be drawn for the future; for example, who will be able, in many developing countries, to improve the situation of rural women?

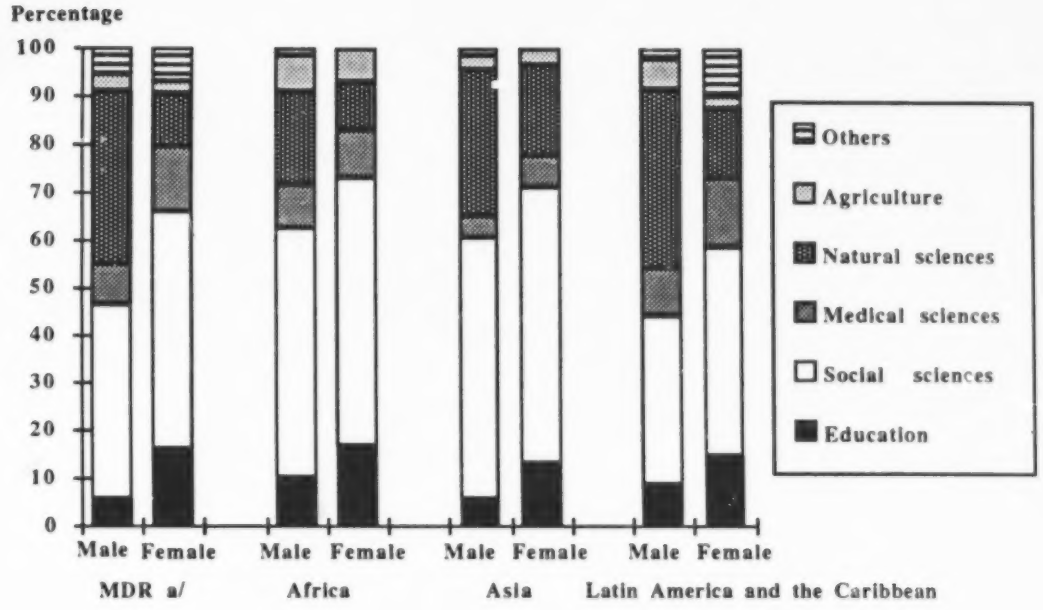
Table 3. Distribution of students by field of study and sex in more developed regions and less developed regions (Percentage)

		More developed regions		Africa		Asia		Latin America and the Caribbean	
		Male	Female	Male	Female	Male	Female	Male	Female
Care-oriented fields	(Education	3	7	7	5	4	4	5	6
	(Social (sciences	23	22	37	17	38	18	21	18
	Medical sciences	5	6	6	3	3	2	6	6
Action-oriented fields	(National (sciences	20	5	14	3	21	6	22	6
	(Agriculture	2	1	5	2	2	1	4	1
	Others	3	3	1	-	1	-	1	4
Total by sex		56	44	70	30	69	31	59	41
Grand total		100		100		100		100	

Source: See table 1.

Note: Numbers have been rounded.

Figure III. Distribution of students by sex and field of study



Source: See table 3.

a/ More developed regions.

Similar remarks can be made concerning the field of natural sciences; however, table 3 has many possible implications for the future role of women in decision-making. In so far as decision-making is not only linked to individuals, but also to the statistical weight and distribution of various groups, the data in the table could mean that women might face difficulties in having an influence in important areas not only for their advancement, but also for development. For example, what could be their weight in decisions on the future of industrialization? It is not enough just to have a minister of industry; women engineers and technicians are also required in the sectors that influence the conception and the implementation of projects. The same can be said for rural development, which leads to such questions as: what would happen to rural women in Africa or Asia if, instead of 7 or 3 per cent of the students choosing to study agriculture, 25 per cent chose to do so, of which over half were women? Of course, such changes would entail many policy and programme measures since it would also be necessary not only to intervene at all levels of education, but also to promote the provision of employment opportunities corresponding to this field of study.

Notes

[1] *Data Highlights No. 6*: Female adult illiteracy; *Data Highlights No. 7*: Enrolment of girls in first- and second-level education and relationship betwen education and age at marriage; *Data Highlights No. 8*: Enrolment of girls in third-level education; *Data Highlights No. 9*: Fields of study of women in higher education.

[2] The source of the data for this issue is the same as that for *Data Highlights No. 9*: United Nations Educational, Scientific and Cultural Organization, *Female Participation in Higher Education: Enrolment Trends, 1975-1982*, Current surveys and research in statistics (Paris, 1985) (CSR-E-50).